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## UNIVERSITIES AS THE SUSTAINABILITY CENTERS: EVIDENCES FROM THE STUDENTS' SURVEY DATA

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**Summary.** *The study was conducted within the framework of The German-Ukrainian University Technology Transfer Internship Program 2021 (GUTT.INUP 2021). The GUTT.INUP 2021 program was aimed at the exchange of pedagogical and research experience between universities in Germany and Ukraine, as well as at mutual acquaintance with the latest scientific achievements of German and Ukrainian scientists, including in the field of sustainable development. The University of Würzburg (Germany) has extensive experience in joining new member universities to the existing Bavarian Network for Sustainability in Higher Education, as well as in organizing and managing student activities in areas related to the implementation of a sustainable development strategy. At present, environmental education, the cultivation of an environmental outlook, and the involvement of students in the activities of universities aimed at implementing the basic principles of environmental sustainability as an important component of a sustainable development strategy are very relevant in the context of global climate change. Using the experience of the University of Würzburg, as well as the practice of other European universities in this field, our team conducted a survey among students from different faculties to collect their perceptions and opinions on*

*sustainable development in higher education and environmental sustainability issues. Based on the results of the survey, we proposed a roadmap for the Ivan Franko National University of Lviv as a future center for sustainable development, including activities aimed at achieving environmental sustainability goals in the context of the sustainable development strategy.*

**Keywords:** *universities, environmental education, students' activities, environmental sustainability, sustainable development*

**Statement of the problem.** Sustainable development is one of the most pronounced challenges of the 21st century. The scientific communities, national governments, educational and social organizations worldwide are currently discussing the content of this concept and how it can be integrated into their policies, organization and operation. A generally accepted definition of the concept of sustainable development was proposed in the Brundtland Commission Report (1987), which defined it as development that meets the needs of the current generation without compromising the ability of future generations to meet their own needs.

The role of education in promoting sustainable development is mentioned in Chapter 36 'Promoting Education, Public Awareness and Training' of Agenda 21 [32] and was also included in the agenda of the 2nd World Summit on Sustainable Development held in Johannesburg in 2002. Participants agreed that education can play an important role in the future implementation of the concept of sustainability, which links economic well-being with respect for cultural diversity, the Earth and its resources [33].

Sustainable development of higher education is critical to national, regional, and global development [13; 16; 18; 20; 26]. Leading universities in the world have already been involved in the process of integrating sustainable development into their activities. However, the shift towards sustainability is associated with inevitable changes in the management, service, education, communication and functions of any university with a genuine interest in sustainable development. In 1999, the Association of University Leaders for a Sustainable Future (ULSF) identified number of areas where universities could be involved in sustainable development (e.g., management, planning, development, research, operations, purchasing, transportation, design, new construction, renovation, community service and outreach education, or capacity building) [30]. Today, capacity building activities are focused on two main areas: capacity building activities among students and staff towards a more sustainable university and campus (with training on issues such as energy efficiency, reducing waste and CO<sub>2</sub> emissions) and activities focused on external resources aimed at building the capacity of the local community to promote sustainable development among a wider group of stakeholders [15; 17; 24; 35].

The triple bottom line theory of sustainable development considers the social, economic and environmental aspects [5, 22, 27]. Environmental sustainability reflects the ability of an organization to effectively use both renewable and non-renewable resources to meet its current needs, with a genuine focus on preserving those resources for future generations [1]. Approaches to environmental sustainability include both incremental and systematic ones that have to be designed and implemented by universities to achieve sustainable development. Incremental approaches relate to the efficient use of available resources,

including operational aspects such as water conservation, energy consumption, material handling, waste management, building design, and more with environmental efficiency in mind. Systematic approaches to sustainability address similar problems, but incorporate them as key components of organizational measures. This encourages organizations to develop long-term plans with comprehensive documentation, operating procedures, assessment criteria, missions and incentives for stakeholder engagement [14].

**Analysis of recent research and publications.** The role of universities as centers of sustainable development is currently being extensively studied [3; 7; 19]. There are many examples of the activities of European universities in the context of sustainable development, including environmental sustainability [22; 25; 34; 36]. In particular, the Julius Maximilian University of Würzburg, one of the largest and oldest institutions of higher education in Germany, has a good track record of developing a sustainable development strategy to address the challenges faced by society [28]. The University of Würzburg has extensive experience in joining new member universities to the existing Bavarian Network for Sustainability in Higher Education, as well as in organizing and managing student activities in areas related to the implementation of a sustainable development strategy [29; 30].

In the context of activities aimed at mobilizing universities working with sustainable development to collect, discuss and implement joint initiatives, the European School of Sustainability Science and Research (ESSSR) should be mentioned [9]. ESSSR is an inter-university consortium composed by members who share an interest in issues related to sustainable development. This also includes coordinating teaching and research activities in the fields of sustainable development and environmental sciences.

Based on the analyzed data on the experience and practice of the universities in Europe [8; 11; 15; 20; 24; 28; 29], as well as symbiotic approaches between the sustainable development of universities and cities, which host them [12; 21], it can be concluded that modern universities have many opportunities to contribute to the achievement of environmental sustainability goals. The role of universities is not only in teaching and learning, but also in outreach education, creation and dissemination of knowledge, as well as in nurturing students' environmental consciousness and social responsibility.

Universities play a tripartite role in relation to society in the context of environmental sustainability. First, universities directly or indirectly meet the needs of faculty, staff, students, and the community. These relationships give rise to many activities that can have an impact on the environment through the mobilization and use of resources, energy consumption, transportation, waste generation, etc. Second, as knowledge-creating entities, universities should be responsible for teaching, creating and disseminating knowledge about environmental sustainability among stakeholders, and for promoting the principles of sustainable development in society. Third, as learning centers, universities must develop learning opportunities for future generations to become friendly to environment and responsible citizens [14; 23]. The academic content of environmental sustainability should not be limited to environmental studies; it should extend to all disciplines taught. Given the vital role of universities in transforming future generations, they must take the lead in accelerating the movement for environmental sustainability not only within their own walls but throughout society [2].

The activities of universities aimed at implementing the basic principles of environmental sustainability as an important component of the sustainable development strategy are very relevant in the context of global climate change, which is one of the main challenges of modern times [17; 24; 27; 36].

**Statement of the task.** The aim of the article is to improve the framework conditions for the development of the Ivan Franko National University of Lviv as a center for sustainable development.

The following specific goals are derived from this general objective:

- organize annually networking events with stakeholders from Ukraine and relevant stakeholders from Germany, and initiate and lead working groups in the following sustainability-related areas: research, teaching, operations, governance and student initiatives;
- connect people and organizations by offering a platform for knowledge exchange in the context of higher education across all faculties;
- activate the public consciousness of students and teachers by informing about current developments and activities related to sustainability in higher education institutions around the world;
- initiate volunteer actions to clean up the territory and support them with a grant.

**Presentation of the main material.** Anthropogenic activities in the last century have led to tremendous changes in the natural environment. Therefore, saving our habitat from degradation and preserving natural resources for future generations is a global challenge.

The introduction of the principles of sustainability in universities and the awareness of students of the main goals of sustainable development is a key step towards preserving the environment [4; 6]. In this context, it is very important to inform young people about global environmental changes, including global warming, as a result of human activities (intensive use of natural fossil fuels, generation of large volumes of waste, environmental pollution with persistent organic pollutants, etc.) and the possibility of improving the situation through the implementation of the principles of sustainable development.

Therefore, the formation of students' awareness that through joint activities we can preserve a good state of the environment and natural resources for future generations, as well as of practical skills in saving energy and water, sorting waste, and caring for nature will be the value achieved as a result of the implementation of this project.

The environmental trends that we face in our global society are different, and some of them are familiar to most people, while some are known primarily to researchers or specialists in this field. In any case, widespread awareness of them will help to develop an approach to environmental sustainability. The key components of environmental sustainability are the elimination of waste and emissions, maximizing energy efficiency and productivity, as well as minimizing activities that may affect the use of natural resources by future generations.

Like other UN Member States, Ukraine has joined the global sustainable development process. After the process of adapting the Sustainable Development Goals (SDGs) to the Ukrainian context, the national system consists of 86 national development goals. National goals and indicators for monitoring the achievement of these goals are reflected in the National

Baseline Report «Sustainable Development Goals: Ukraine». A total of 17 goals and 86 national targets were included in 145 government regulations, and 1,052 targets and 3465 measures provided for in these acts were aimed at achieving the goals and objectives.

Goal 4 concerns education and, according to the Ukrainian Sustainable Development Decree, states: ensuring the inclusive and equitable quality education and promoting lifelong learning opportunities to everyone. This means that by 2030, all students will acquire knowledge and skills on the principles of sustainable development, including a healthy lifestyle, human rights, a safe environment, gender equality, the promotion of a culture of peace and non-violence, patriotic education, and awareness of the value of cultural diversity and cultural contribution.

In accordance with the adopted strategy, Ivan Franko National University of Lviv professes universal and national values and, as a center of education, science, culture, and spirituality, promotes them in various ways, including social and environmental responsibility.

Occasional events and lectures on sustainable development are held at Ivan Franko National University of Lviv and, in particular, at the Geography and Biology Faculties. Some lecturers initiate the clean-up of protected areas around Mount Hoverla, where the student internship center is located. However, such episodic activities and teaching of some disciplines will not form a value orientation of our students towards sustainable development.

Therefore, we analyzed the experience of European universities, which, by using various methods, contribute to the formation of a responsible attitude of the young generation to the exhaustible resources of the planet.

Campus environmental management (campus greening) is a critical element in promoting sustainable development at the university level [15]. The campus greening initiative has been practiced at leading universities for decades. These activities can be significantly improved by developing students' ecological thinking, awareness of climate change, concern about the depletion of natural resources, and a commitment to conserving critical resources to ensure their availability for future generations.

Another initiative is the transformation of the university campus into a living laboratory, that is, a testing ground, where students and teachers develop solutions that help protect nature and improve human health [10].

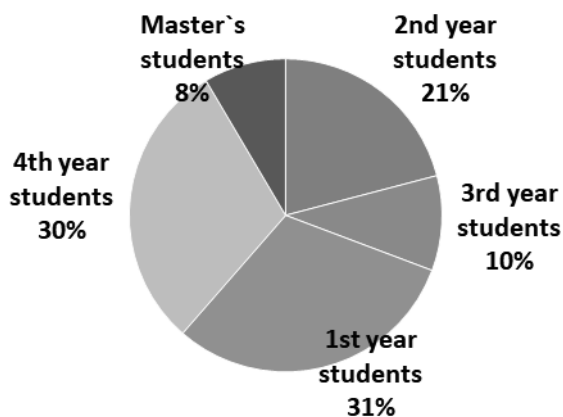
Below is a shortlist of activities carried out at selected universities in the context of environmental education and greening initiatives.

- Organization of meetings, screening of documentaries and films aimed at familiarizing students with the goals of sustainable development (TU Eindhoven);
- Conducting swap events allowing students to exchange clothes or textbooks that they no longer need (Erasmus University Rotterdam);
- Conducting network meetings (TU Delft; Otto von Guericke University Magdeburg);
- Organization of excursions to sustainable development projects in the region, such as nature reserves, wind parks, waste handling facilities, etc. (TU Delft; University of Konstanz; TU Kaiserslautern);
- Managing a repair café that teaches students how to repair broken items (KU Leuven);

- Organizing runs for students to play sports and collect debris while running (HU University of Applied Sciences Utrecht);
- Organization of sustainability tours to showcase innovative sustainability projects on campus, such as newly renovated buildings, solar panels or green roofs (TU Eindhoven; HU University of Applied Sciences Utrecht);
- Conducting Student Cooking Days so that students can sell homemade organic food to other students (Wageningen University & Research);
- Organization of panel discussions with the University authorities on sustainability issues at the university (University of Konstanz);
- Organization of sustainability days, conferences, information markets, or festivals for students in the context of sustainable development (HU Utrecht; Erasmus University Rotterdam; University of Gothenburg).

To collect students' perceptions and opinions on sustainable development and environmental sustainability issues, our team conducted a survey of students from the Geography Faculty (Department of Tourism) and Biology Faculty (Department of Ecology) of the Ivan Franko National University of Lviv. The purpose of the survey was to find out how students perceive the main environmental problems, identify their causes and possible solutions. We sought to understand what kind of environmental behavior we are ready to practice today within the walls of the University and how students themselves can join in improving the environmental situation in our region.

Questionnaire consisting of 27 questions was developed to analyze the target audience. The questionnaire was made available to 153 students of the Department of Tourism (125 female and 28 male persons) and 20 students of the Department of Ecology. Among the respondents 47 respondents (31%) were first-year students, 32 respondents (21%) were second-year students, 15 respondents (10%) were third-year students, 46 respondents (30%) were fourth-year students and 13 respondents (8%) were master's students. The proportion of 1st–4th year students and master students among the respondents is shown in Fig. 1.



**Fig. 1. The proportion of 1st–4th year students and master students among the questionnaire respondents**

The first 17 questions of the questionnaire concerned the general environmental problems of the places where the students were born and raised (Table 1).

The state of the environment in the hometown (village) where the students come from was assessed as satisfactory by 64 respondents, which accounted for 42% of the total number of respondents. However, the majority of responses, namely 49% (75 respondents) rated it as unsatisfactory; 9% (14 respondents) were undecided and indicated that they did not know the condition (Fig. 2).

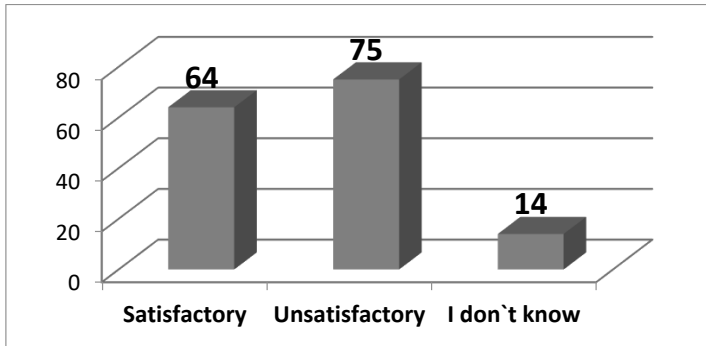


Fig. 2. Satisfaction of students with the state of their environment (number of persons)

An interesting fact is that for some students the state of the environment and air pollution was a mystery. In the course of the survey, some of them were not sure whether these problems are being monitored at all.

An important task of the questionnaire was to identify, according to the respondents, the biggest problems of their locality. As can be seen from the pie chart, about 46% of respondents consider environmental pollution to be the biggest problem; 31% and 13% of respondents consider that the biggest problem is employment and education, respectively; 18% of respondents noted other important problems and only 4 respondents noted drinking water problems in their region (Fig. 3).

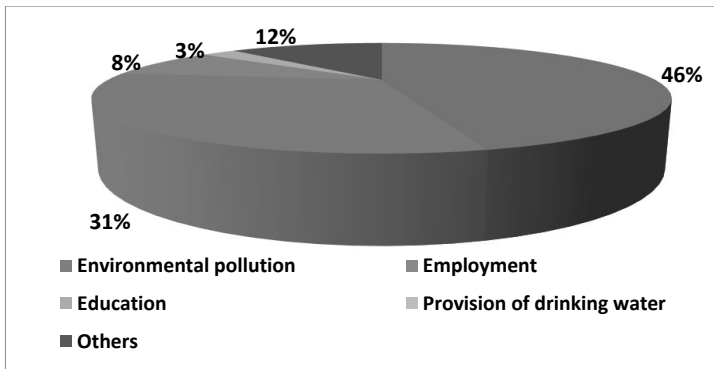


Fig. 3. Types of environmental problems according to the answers of students surveyed (percentage)

Table 1

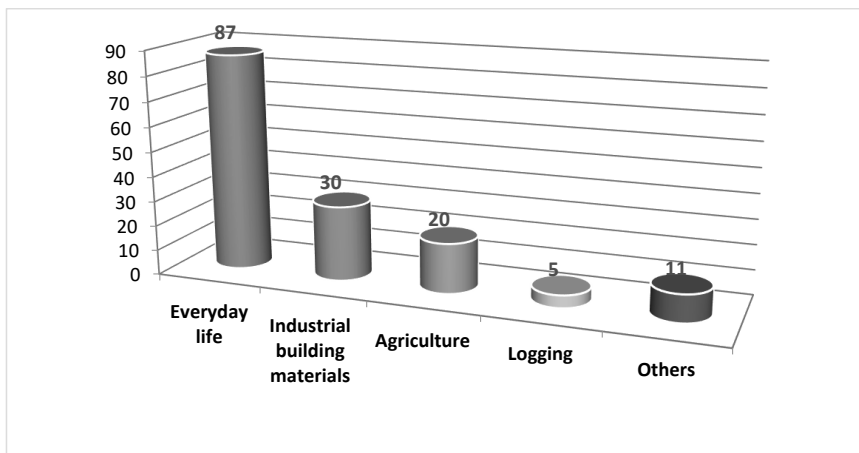
**Questions and answers of the questionnaire, which determined the level of students' awareness of the state of the environment and the main problems of sustainable development**

№	Question	Answer				
		3		4		
1.	Please indicate your gender.	82% female		18% male		
2.	What year student are you?	31% first-year students	21% second-year students	10% third-year students	30% fourth-year students	8% master's students
3.	How do you estimate the state of the environment in your hometown /village?	42% satisfactory	49% unsatisfactory	9% were undecided and indicated that they did not know the condition		
4.	What are the biggest problems of your locality in your opinion?	46% environmental pollution	31% employment	8% other	3% education	2% drinking water
5.	What is the largest source of waste in the area where you live?	56,8% everyday life	13% agriculture	19,6% industry	3,2% logging	7,4% others
6.	Where is waste dumped in your area where you live?	46% have centralized garbage collection	43% of landfills are located in natural areas	6% burn garbage on their own plots		
7.	Are you aware of the damage caused by burning dry grass, stubble, etc.?	97% of respondents are aware				
8.	Do you sort garbage?	53% yes		47% no		
9.	Is there enough informational and educational work at the national and local levels on the organization of proper waste management in your opinion?	79% no		21% yes		
10.	Do you compost organic residues (leftovers, etc.)?	40% yes				
11.	Are you ready to pay for the collection and removal of household waste, to implement their sorting and recycling?	75% yes		3.2% no		20% don't know the answer for the question
12.	What are the biggest environmental problems of your locality in your opinion?	5.2% unsatisfactory quality of drinking water	7.1% stray animals	44.2% pollution by household waste (garbage)	15% river and lakes pollution	8.5% deforestation
13.						5.2 other problems
						10.3% air pollution
						4.5% unsatisfactory work of utilities (or lack thereof)



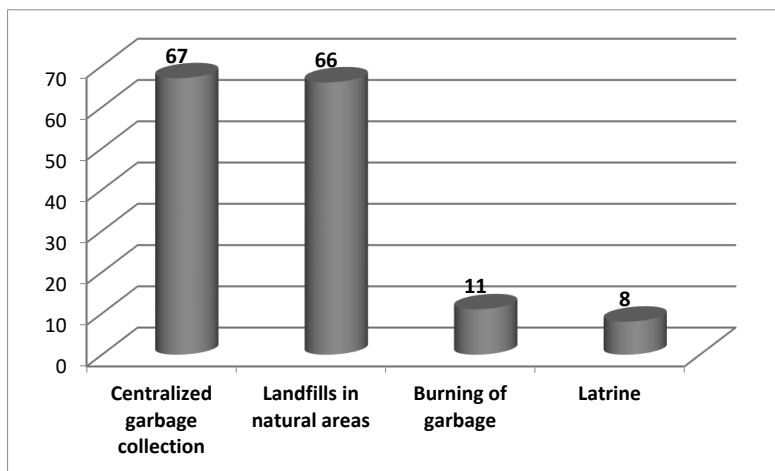
1	2	3		4
14.	How often do you take plastic bags in stores /supermarkets?	57% come to the store with their package	43% use eco-bags, wicker bags, etc	
15.	Are you ready to refuse from plastic bags?	96 % yes	4% no	
16.	Are you familiar with the concept of «sustainable development»?	87 % yes	13% no	
17.	Would you like to be more informed about the state of the environment?	83 % yes	17 % no	
18.	Do you take part in measures to improve the environment (toloka, ecological education, etc.)?	37% participated in measures to improve the environment, including Toloki, environmental education	63% are involved as volunteers in activities related to sustainable development	

The largest sources of waste in the area where students live are: everyday life (87 respondents), industrial building materials (30 respondents), agriculture (20 respondents), logging (5 respondents), others (11 persons) (Fig. 4).



**Fig. 4. Sources of environmental pollution according to the answers of students (number of persons)**

Unfortunately, only 43% of the students surveyed have centralized garbage collection; 43% of respondents note that landfills are located in natural areas, and 7% of respondents burn waste on their own plots (Fig. 5).

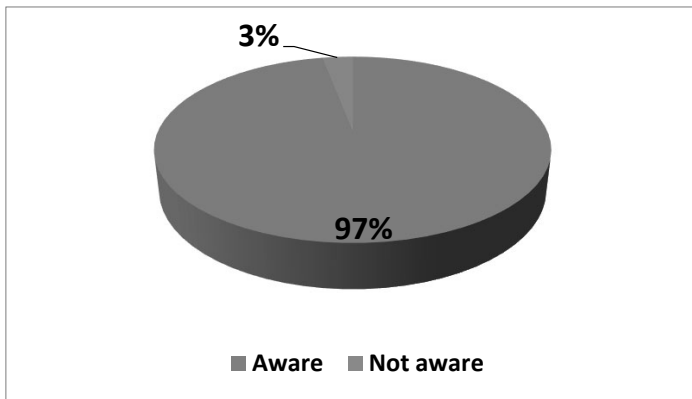


**Fig. 5. Types of garbage collection in the families of surveyed students (number of persons)**

In the course of the survey, students most often mentioned the irregular removal of garbage, littering of urban and rural streets. In many regions where students came from there

is no infrastructure for sorting waste. The main problem throughout Ukraine is the acute shortage of incinerators. According to the students' opinion, the problem of waste is most acute for them because it is visible, they face it every day and that is why this problem is of great concern to them. Respondents talked a lot about the irregular removal of garbage from residential areas and littering of public spaces.

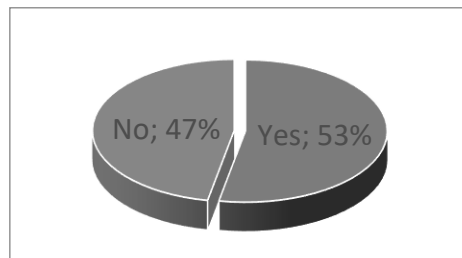
It is very important that 97% of respondents are aware of the harm caused by burning dry grass, stubble (Fig. 6). When one ton of plant residues is burned, about 9 kg of smoke micro particles are released into the air. They include dust, nitrogen oxides, carbon monoxide, heavy metals and a number of carcinogenic compounds. In the smoldering leaves, which have no access to oxygen, benz( $\alpha$ )pyrene is released, which can cause cancer in humans. In addition, smoke releases dioxins, which belong to the most toxic substances for humans. In addition to the immediate threat to human health, burning leaves and dry grass also destroys the ecosystem.



**Fig. 6. The level of students' awareness of the harmfulness of burning garbage (in percent)**

The answers to the question «Do you sort garbage?» were divided: 81 respondents answered in the affirmative (Yes), and 72 respondents answered that they do not sort garbage (No) (Fig. 7).

Lviv residents have opportunity to sort waste since 2010, but not everyone does this. Containers for paper, glass and plastic are available, but not all residents separate waste. Today waste sorting is especially important for Lviv, which has been left without a landfill and has problems with the removal of solid waste. If the majority of residents sorted garbage, it would be a third less and, therefore, would reduce the cost of waste disposal. Unfortunately, not all students as representatives of the young generation think about it. The experience of developed countries



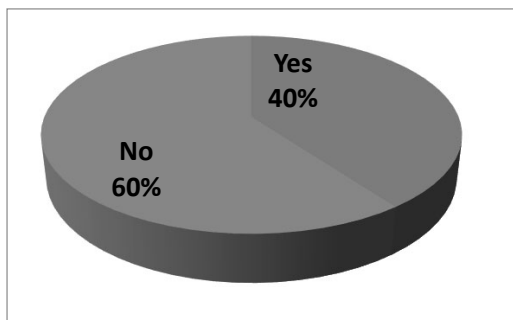
**Fig. 7. Waste sorting in students' families (percentage)**

shows that for decades other countries have been testing many technologies to solve the problem of waste. The city of Lviv, and Ukraine in general, must promptly use the best experience and implement it into practice. A big breakthrough in this direction is that the State Inspectorate for Architecture and Urban Planning (DIAM) has issued a permit for the construction of a waste processing plant in Lviv. The capacity of the Lviv waste processing plant, which will be built near the «Lvivvodokanal» treatment plant, will be 240,000 tons of waste per year.

Unfortunately, today there is a rather low level of informational and educational work on the organization of proper waste management. As part of the «Strategy for solid waste management in Lviv», an information campaign is being developed that will explain to Lviv residents how to sort garbage properly and how to make money on this.

When we asked students, 79% of them agreed that there is not enough information about this problem. That is why we need to inform more actively about the correct behaviour of waste management.

The problem of composting organic waste is also very important and relevant. Compost is organic material that can be added to soil to help plants grow. Food scraps and yard waste

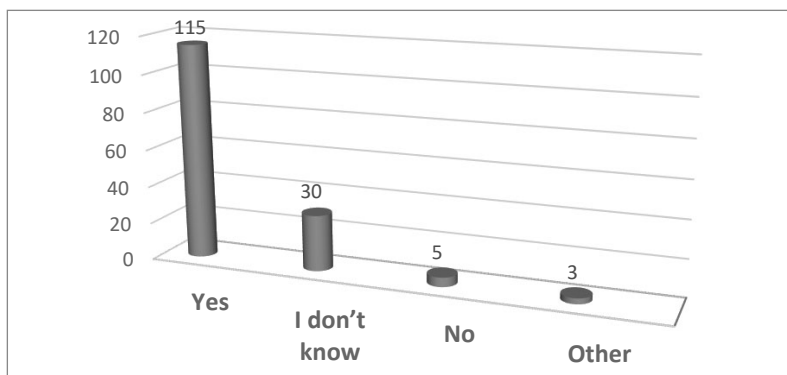


**Fig. 8. Composting of organic waste in the families of students (percentage)**

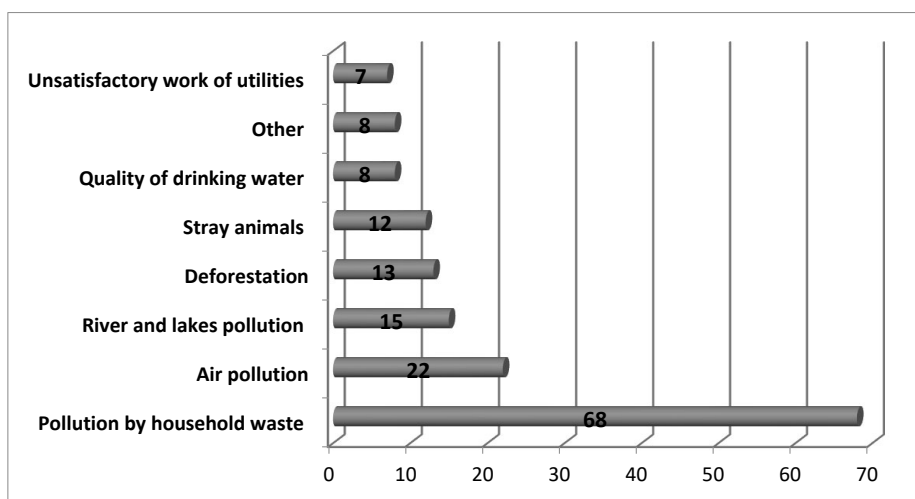
together currently make up more than 30 percent of what we throw away, and could be composted instead. Making compost keeps these materials out of landfills where they take up space and release methane, a potent greenhouse gas. 61 respondents compost organic waste residues, and 92 individuals don't compost. This is 40% and 60% respectively (Fig. 8).

The level of consciousness of young people who are willing to pay additional funds for the collection and removal of household waste, for the introduction of their sorting and recycling is very high and comprises 75% (115 respondents). 20% of respondents don't know the answer for the question (Fig. 9).

Among the largest environmental problems of their locality, the students named: unsatisfactory quality of drinking water (8 respondents), pollution by household waste (garbage) (68 respondents), deforestation (13 respondents), unsatisfactory work of utilities (or lack thereof) (7 respondents), stray animals (12 respondents), river and lakes pollution (15 respondents), air pollution (22 respondents), other problems (8 respondents). The biggest number of respondents considers the pollution of household waste to be the first of all environmental problems. The problem of landfills did not appear in Ukraine today or yesterday – it arose decades ago and some landfills have grown so large that they look almost like states within a state. There are almost 6,000 official (controlled) landfills in Ukraine, and up to 30,000 natural (uncontrolled) landfills, which is about 7% of the total area of Ukraine. And the total amount of waste at all landfills, including industrial, is more than 450 million tons per year, many of which are hazardous.



**Fig. 9. Willingness of students to pay additional funds for waste recycling (number of persons)**



**Fig. 10. The main environmental problems according to students' opinion (number of persons)**

Currently, every citizen of Ukraine uses about 500 plastic bags per year, while in the EU this number is about 90 bags. The Law of Ukraine 'On limiting the circulation of plastic bags on the territory of Ukraine' was adopted on 06/01/2021, and its entry into force took place on 12/10/2021. Such legislative activity will not only bring Ukrainian legislation closer to EU legislation and practice, but will also improve the state of the environment and benefit the consumer.

Therefore, our next question to students was «How often do you take plastic bags in stores / supermarkets?» and 57% answered that they come to the store with their package, and 33% use eco-bags, wicker bags, etc. The fact that 96% of students are ready to give up plastic bags is promising.

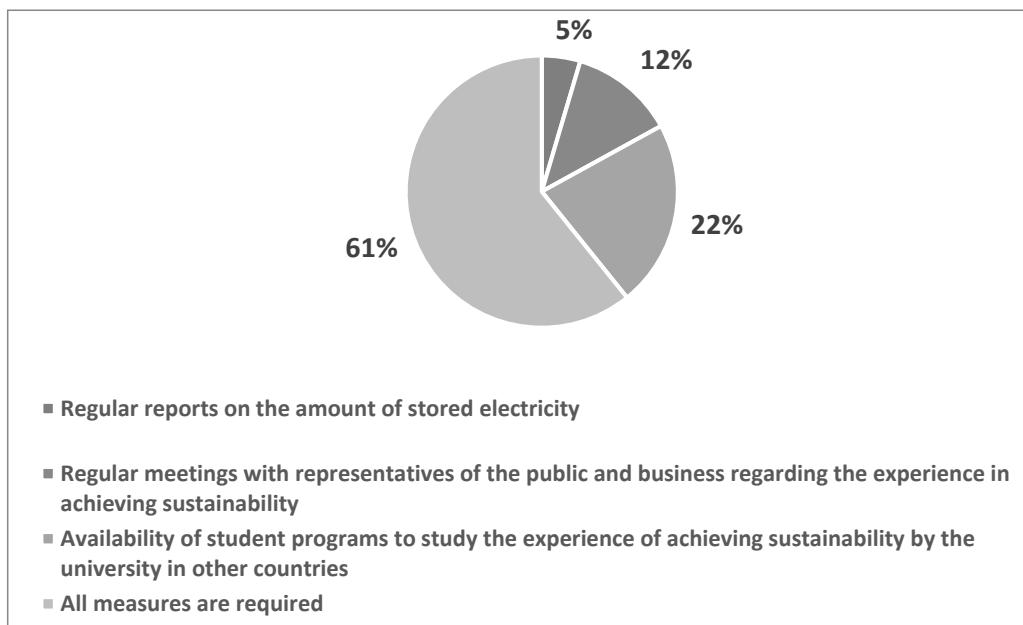
Table 2

**Questions and answers of student questionnaires, highlighting the level of students' awareness of the role of the university as a center for sustainable development**

	22% availability of student programs to study the experience of achieving sustainability by the university in other countries	5% regular reports on the amount of stored electricity	12% regular meetings with representatives of the public and business regarding the experience in achieving sustainability	61% all measures are required
1	What measures that promote the sustainability of society would be appropriate to introduce at the University?			
2	Are there sorting containers installed at the University?	23% yes	77	no
3	Are there enough lectures, meetings, etc. on sustainable development at the University?	63% no	37	yes
4	Are students and lecturers at the University involved as volunteers in activities related to sustainable development?	67 % yes	33	no
5	Is there a structure in the University that deals with its sustainable development, or a coordinator who manages the sustainable progress of the University?	51 % yes	49	no
6	Does the university curriculum include disciplines that raise topics from a social, economic, and environmental perspective?	62 % yes	4.5 % no	33.5 % not enough
7	Do the results of research at the University help to educate the general public and are accessible to all?	33 % yes	8.8 % no	58.2 % do not know
8	Do you know to what extent University research leads to the creation of new policies, technologies and patents that have a positive impact on society?	50 % do not know		50 % yes

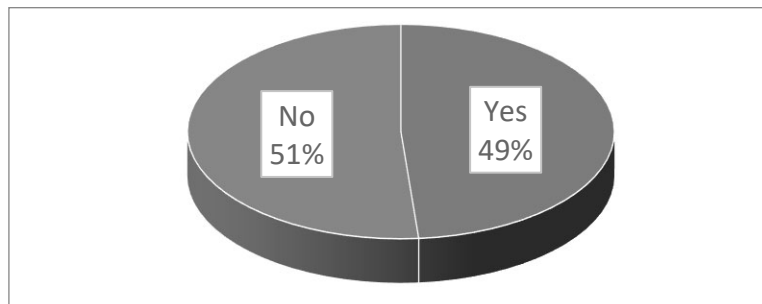
It is very important for young people to understand the above issues, because improving the ecological state of the environment, taking urgent measures to improve the system of collection, sorting, transportation, processing and disposal of waste is an issue that affects everyone without exception, and young people must take a course to ensure sustainable development of Ukraine and the region, including. We asked if they had heard of the concept of sustainable development and 87%, of which 133 respondents said yes, 83% would like to be more informed about the environment, and 37% participated in measures to improve the environment, including Toloki, environmental education, etc., 102 respondents (67%) are involved as volunteers in activities related to sustainable development.

It is very important that the educational consciousness of the young generation and students is formed in educational institutions. The foundations of values are laid on the basis of sustainable development and environmentally responsible behavior. Unfortunately, today the University needs to hold more events that will promote the sustainability of society. As can be seen from the pie chart below, 100% of students consider one or another environmental event necessary, which indicates the environmental awareness of young people and interest in this problem, but the number and level of such activities within Ivan Franko National University of Lviv should be better. Such activities can include Regular reports on the amount of stored electricity; regular meetings with representatives of the public and business regarding the experience in achieving sustainability; availability of student programs to study the experience of achieving sustainability by the university in other countries.



**Fig 11. Measures to be taken by the university as a center of sustainable development according to students' survey (percentage)**

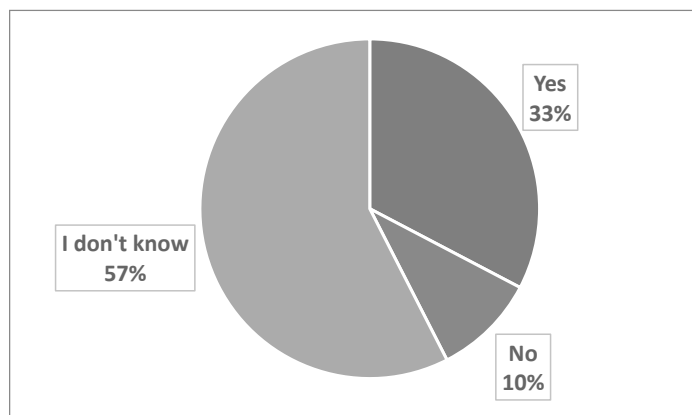
According to the survey, 96 respondents (63%) believe that there are not enough such meetings at the University. About half of the respondents (51%) do not know whether there is a structure in the University that deals with the problems of sustainable development, or whether there is a coordinator who manages the sustainable progress of the University.



**Fig. 12 The level of students' awareness about the special department of sustainable development in the structure of the university (in percent)**

About 62% of respondents have mentioned that there is a university curriculum of disciplines that raise topics from a social, economic and environmental point of view in the training of specialists in their specialty; 35% of respondents consider this insufficient.

To the question «Do the results of research at the University help to educate the general public and are accessible to all?» 57% of students did not know the answer, and 33% of the answered in the affirmative.



**Fig. 13. Students' awareness of the role of the university as a center for sustainable development (percentage)**

Also, 76 respondents (50%), could not determine the answer to the extent to which University research leads to the creation of new policies, technologies and patents that have a positive impact on society, and only 32 respondents (21%) answered in the affirmative.



Thus, the greening of higher education, sustainable development at Ivan Franko National University of Lviv should become a systematic, purposeful research activities aimed at developing the student's personality – the future of our country and preparing it for future professional activities on the basis of sustainable development. The University should become the very center where the ecological intelligence and worldview of the future specialist are nurtured. The implementation of the ideas of sustainable development in both school and higher education remains relevant today, which is important to do by means of greening the content of all disciplines and the organization of special thematic programs; strengthening the links between the disciplines of natural sciences and social and economic cycles of training specialists with higher education; development of a profile system of forming an active life position of students in the field of ecological culture and eco-outlook. At the same time, according to the data obtained as a result of a survey, work on the greening of educational activities, the vector of sustainable development at the Ivan Franko National University of Lviv, there is a wide range of unresolved issues and gaps.

### **Prospects for further activities**

Based on the results of the study, it is possible to propose a roadmap of events to be held at the Ivan Franko National University of Lviv, with the following steps of project implementation:

Step 1 – First year (Sustainability events for starters, who are just starting out to learn how to organize events based on other universities)

Based on the experience of leading European universities in implementing the principles of sustainable development, our actions under the 1st step of the project will focus on the following activities:

- Organizing meetings and conversations with student groups interested in creating initiatives and activities aimed at more sustainable development of the university and campus, explaining the importance of saving energy and water, reducing and sorting waste, etc.;
- Continuous cooperation with sustainability-focused student groups;
- Arranging the excursions to familiarize students with sustainable development projects in the Lviv region, including the Yavoriv National Park, organic farms and the Lviv organic waste composting station;
- Organization of sustainability days at Ivan Franko National University of Lviv;
- Conducting a student conference to exchange information among students about activities carried out at other universities in the field of sustainable development and greening of campuses.

Step 2 – Second year (the following events require more planning, time, and collaboration with external stakeholders)

- Creating a 'Sustainable Business Battle' to inspire students to develop sustainable business cases for local companies;
- Organization of a one-semester lecture series or alternate introductory week on socio-environmental topics;

- Conducting a ‘Faculty Challenge’, where different faculties compete in which of the faculties is the most sustainable;
- Organization of a ‘warm-sweater day’ by reducing building temperatures by three degrees, distributing free second-hand sweaters and raising awareness of the impact of energy consumption on climate change;
- Organization of a large discussion of the climate change model;
- Offering a summer school program on sustainable development topics such as global warming, biodiversity or circular economy.

#### Step 3 – Summer Camp in Vorokhta, Ivano-Frankivsk region

The 3rd step of the project is the organization of a summer eco-camp for students, which will provide an opportunity to combine eco-learning in the context of sustainable development with practical skills.

- *Eco-Camp* – an ecological camp with master-classes, excursions, lectures and cleaning of the territory.
- *The main goal* is to conduct an ecological-educational camp ‘Ecoboom’ on 25–30.05.2023 for 20 young people aged 18 to 30 with the aim of increasing the ecological awareness of the young generation of Ukrainians and improving the ecological state of the Ukrainian Carpathians; carry out activities aimed at preserving the biodiversity of the Carpathians, as well as travel through the Carpathian Mountains.
- *Skills*: skills regarding nature protection and resource conservation; organizational skills, time management, leadership, teamwork, communication and collaboration skills, diligent learning, creativity, responsible and critical thinking, problem solving skills.

Camp ‘Ecoboom’ will be organized at the Youth Center (Fig. 14) in the village of Vorokhta, Ivano-Frankivsk region, which will become the base for the 3rd step of our project.



**Fig. 14. Youth Center in the village of Vorokhta, Ivano-Frankivsk region**

#### **Results which we expect to achieve based on our goals:**

- young people and local residents will be aware of effective ways to conserve natural resources and protect the environment and will know how to reduce environmental pollution;

- participants and local residents will receive information about the current ecological state of the Ukrainian Carpathians;
- young people will be environmentally conscious and aware of the harmful effects of anthropogenic activities on the environment;
- local residents and participants will take responsibility for the ecological state of the natural ecosystems of the Ukrainian Carpathians;
- young people will know how to properly sort the garbage and handle waste;
- the most popular tourist sites of the Chornohora ridge will be cleaned of pollution and debris;
- participants will lead an active and healthy lifestyle and promote the principles of sustainable development among their peers.

**Conclusions.** An analysis of the activities of European universities shows that there are many opportunities for universities to contribute to the achievement of environmental sustainability goals. Universities are excellent venues for improving environmental education, accelerating and expanding solutions that can have an impact on the environment, and implementing sustainable development principles. In the context of the strategy of sustainable development and greening of higher education, Ivan Franko National University of Lviv should become the center for the formation of environmental consciousness and worldview of the future specialist. As evidenced from the students' survey data, it is necessary to create a separate unit in the structure of the University to coordinate all measures of sustainable development. A wide range of activities that contribute to the implementation of environmental sustainability goals can be developed at Lviv University. These include, in particular: strengthening environmental education and research activities; teaching courses on environmental protection and resource conservation at most faculties; campus environmental management (campus greening); organization of meetings, panel discussions on environmental sustainability at the university; organization of conferences, sustainable development days or festivals for students and educators in the context of sustainable development; arranging of an ecological camp with master classes, excursions and lectures. At the same time, Ivan Franko National University of Lviv can become a platform for coordinating and integrating the activities of higher educational institutions in the region in the field of sustainable development, for exploring new ideas and developing innovative approaches to environmental protection in order to achieve the sustainable development goals.

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## УНІВЕРСИТЕТИ ЯК ЦЕНТРИ СТАЛОСТІ: РЕЗУЛЬТАТИ ДАНИХ СТУДЕНТСЬКОГО ОПИТУВАННЯ

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Дослідження проводилося в рамках Програми стажування з трансферу технологій німецько-українського університету 2021 (GUTT.INUP 2021). Метою програми GUTT.INUP 2021 був обмін педагогічним та дослідницьким досвідом між університетами Німеччини та України, а також взаємне ознайомлення з останніми науковими досягненнями німецьких та українських учених, у тому числі у сфері сталого розвитку. Університет Вюрцбурга (Німеччина) має великий досвід приєднання нових університетів-членів до існуючої Баварської мережі сталого розвитку вищої освіти, а також організації та управління діяльністю студентів у сферах, пов'язаних із впровадженням стратегії сталого розвитку. На сьогодні екологічна освіта, виховання екологічного світогляду, залучення студентів до діяльності університетів, спрямованої на впровадження основних принципів екологічної сталості як важливої складової стратегії сталого розвитку, є дуже актуальними в умовах глобальних змін клімату. Використовуючи досвід Університету Вюрцбурга, а також практику інших європейських університетів у цій галузі, наша команда провела опитування серед студентів різних факультетів, щоб зібрати їх сприйняття та думки щодо сталого розвитку у вищій освіті та питань екологічної стійкості. За результатами опитування ми запропонували дорожню карту Львівського національного університету імені Івана Франка як майбутнього центру сталого розвитку, включно з діяльністю, спрямованою на досягнення цілей екологічної сталості в контексті стратегії сталого розвитку.

**Ключові слова:** університети, екологічна освіта, діяльність студентів, екологічна сталість, сталий розвиток

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